



HAC TEST REPORT

Applicant HMD Global Oy
FCC ID 2AJOTTA-1223
Product mobile phone
Brand Nokia
Model TA-1223
Report No. R2001A0040-H1
Issue Date March 13, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **ANSI C63.19-2011**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.2 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
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1.3 Laboratory Environment

Temperature	Min. = 18°C, Max. = 28 °C
Relative humidity	Min. = 0%, Max. = 80%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

2 Statement of Compliance

Table 2.1: The Total M-rating of each tested band

Mode	Rating
GSM 850	M4
GSM 1900	M4
WCDMA & LTE & Wi-Fi	M4
The Total M-rating is M4	
Date of Testing: March 2, 2020	
<p>Note: Refer to section 7 Evaluation for Low-power Exemption. RF Emission testing for this device is required only for GSM voice modes. WCDMA, LTE mode and Wi-Fi 2.4G 802.11b/g, Wi-Fi 5G 802.11amodes applicable air-interfaces are exempt from testing in accordance with C93.19-2011 Clause 4.4 and are rated M4.</p> <p>All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.</p>	

3 Description of Equipment under Test

Client Information

Applicant	HMD Global Oy
Applicant address	Bertel Jungin aukio 9,02600 ESPOO. FINLAND
Manufacturer	HMD Global Oy
Manufacturer address	Bertel Jungin aukio 9,02600 ESPOO. FINLAND

General Technologies

Device Type:	Portable Device	
State of Sample:	Prototype Unit	
Model:	TA-1223	
IMEI:	IMEI 1:355795100012133 IMEI 2:355795100014907	
Hardware Version:	LLDM528	
Software Version:	LLDB7749	
Antenna Type:	Internal Antenna	
Power Class:	GSM 850:4 GSM 1900:1 UMTS Band II/IV/V:3 LTE FDD 2/4/5/7/12/13/17/66:3	
Power Level	GSM 850:level 5 GSM 1900:level 0 UMTS Band II/IV/V:all up bits LTE FDD 2/4/5/7/12/13/17/66:max power	
Test Modulation:	(GSM)GMSK;(WCDMA) QPSK; (LTE) QPSK, 16QAM, 64QAM;	
Operating Frequency Range(s):	Mode	Tx (MHz)
	GSM 850	824 ~ 849
	GSM 1900	1850 ~ 1910
	WCDMA Band II	1850 ~ 1910
	WCDMA Band IV	1710 ~ 1755
	WCDMA Band V	824 ~ 849
	LTE Band 2	1850 ~ 1910
	LTE Band 4	1710 ~ 1755
	LTE Band 5	824 ~ 849
	LTE Band 7	2500 ~ 2570
	LTE Band 12	699 ~ 716
	LTE Band 13	777 ~ 787
	LTE Band 17	704 ~ 716



	LTE Band 66	1710 ~ 1780
	Bluetooth:	2400 ~ 2483.5
	WIFI 2.4G:	2400 ~ 2483.5
	WIFI 5G(U-NII-1):	5150 ~ 5250
	WIFI 5G(U-NII-3):	5725 ~ 5850
Accessory Equipment		
Battery 1	Manufacturer: Jiade Energy Technology (Zhuhai) Co., Ltd. Model: LC-440	
Battery 2	Manufacturer: Jiade Energy Technology (Zhuhai) Co., Ltd. Model: LC-440U	
Earphone	Manufacturer: Huizhou New Leader Industry Co., Ltd. Model: NLD-EM300M-03SF	
Adapter 1	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21E	
Adapter 2	Manufacturer: Jiangsu Chenyang Electron Co., Ltd. Model: AD-10WE	
Adapter 3	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21U	
Adapter 4	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21N	
Adapter 5	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21X	
Adapter 6	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21A	
Adapter 7	Manufacturer: DONGGUAN AOHAO POWER TECHNOLOGY CO., LTD. Model: AD-10WR	
Adapter 8	Manufacturer: SHENZHEN TIANYIN ELECTRONICS CO.,LTD. Model: CH-21B	
USB Cable 1	Manufacturer: Xiamen Li Qi Electronics Co., Ltd. Model: CB-61A	
USB Cable 2	Manufacturer: Saibao (Jiangxi) Industrial Co. , Ltd. Model: CB-61A	
Note: The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.		



Air-Interface	Band (MHz)	Type	ANSI C63.19 tested	Simultaneous Transmissions	Voice over Digital Transport OTT Capability	Name of Voice Service	Power Reduction
GSM	850	VO	Yes	Yes BT and Wi-Fi	N/A	#	No
	1900		No		No		
	GPRS/EGPRS	DT	No		No		
WCDMA	Band II	VO	Yes	Yes BT and Wi-Fi	N/A	#	No
	Band IV						
	Band V						
	HSPA	DT	No		No		
LTE	Band 2	VD	Yes	Yes BT and Wi-Fi	No	Yes##	No
	Band 4						
	Band 5						
	Band 7						
	Band 12						
	Band 13						
	Band 17						
Band 66							
Wi-Fi 2.4G	2450	VD	No	Yes GSM, WCDMA, LTE,	No	Wi-Fi Calling	No
Wi-Fi 5G U-NII-1	5200	VD	No	Yes GSM, WCDMA, LTE,	No	Wi-Fi Calling	No
Wi-Fi 5G U-NII-3	5800	VD	No	Yes GSM, WCDMA, LTE,	No	Wi-Fi Calling	No
Bluetooth (BT)	2450	DT	No	Yes GSM, WCDMA, LTE,	N/A	NA	No

VO= legacy Cellular Voice Service from Table 7.1 in 7.4.2.1 of ANSI C63.19-2011

DT= Digital Transport only (no voice)

VD= IP voice service over digital transport.

#: Ref Lev in accordance with 7.4.2.1 of ANSI C63.19-2011

##: Ref Lev in accordance with the July 2012 VoLTE interpretation.

Remark:

1. It applies the low power exemption based on ANSI C63.19-2011
2. This device has no VOIP function for LTE and WLAN.



4 Test Specification and Operational Conditions

4.1 Test Specification

The tests documented in this report were performed in accordance with the following:

FCC CFR47 Part 20.19

ANSI C63.19-2011

KDB 285076 D01 HAC Guidance v05

KDB 285076 D02 T-Coil Testing v03

5 Test Information

5.1 Operational Conditions during Test

5.1.1 General Description of Test Procedures

The phone was tested in all normal configurations for the ear use. The EUT is mounted in the device holder equivalent as for classic dosimeter measurements. The acoustic output of the EUT shall coincide with the center point of the area formed by the dielectric wire and the middle bar of the arch's top frame. The EUT shall be moved vertically upwards until it touches the frame. The fine adjustment is possible by sliding the complete. The EUT holder is on the yellow base plate of the Test Arch phantom. These test configurations are tested at the high, middle and low frequency channels of each applicable operating mode.

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The EUT is commanded to operate at maximum transmitting power.

5.2 HAC RF Measurements System Configuration

5.2.1 HAC Measurement Set-up

These measurements are performed using the DASY5 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Stäubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements. Cell controller systems contain the power supply, robot controller, teach pendant (Joystick) and remote control, and are used to drive the robot motors. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification; signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

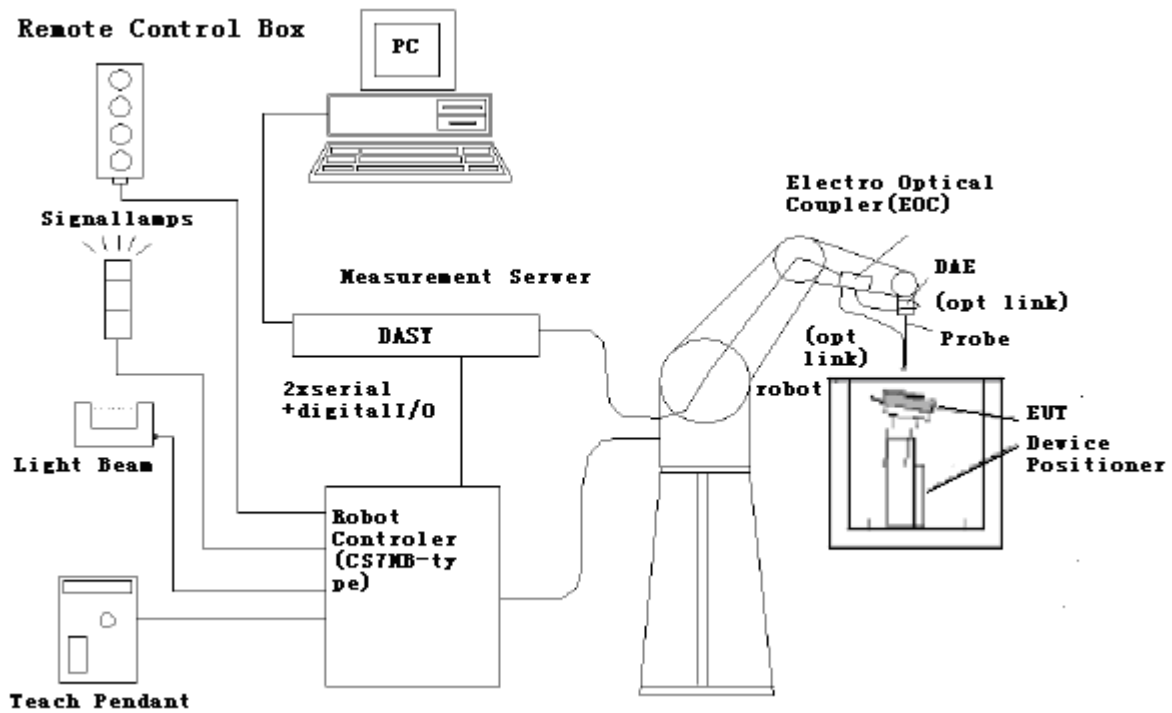


Figure 1 HAC Test Measurement Set-up

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

5.2.2 Probe System

The HAC measurements were conducted with the E-Field Probe ER3DV6 and the H-Field Probe H3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

E-Field Probe Description

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy $\pm 6.0\%$, $k=2$)
Frequency	40 MHz to > 6 GHz (can be extended to < 20 MHz) Linearity: ± 0.2 dB (100 MHz to 3 GHz)



Figure 2 ER3DV6 E-field

Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)	Probe
Dynamic Range	2 V/m to > 1000 V/m; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm	
Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms	

5.2.3 Test Arch Phantom & Phone Positioner

The Test Arch phantom should be positioned horizontally on a stable surface. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. It enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot (Dimensions: 370 x 370 x 370 mm). The Device reference point is set for the EUT at 6.3 mm, the Grid reference point is on the upper surface at the origin of the coordinates, and the “user point \Height Check 0.5 mm” is 0.5mm above the center, allowing verification of the gap of 0.5mm while the probe is positioned there.

The Phone Positioner supports accurate and reliable positioning of any phone with effect on near field $<\pm 0.5$ dB.

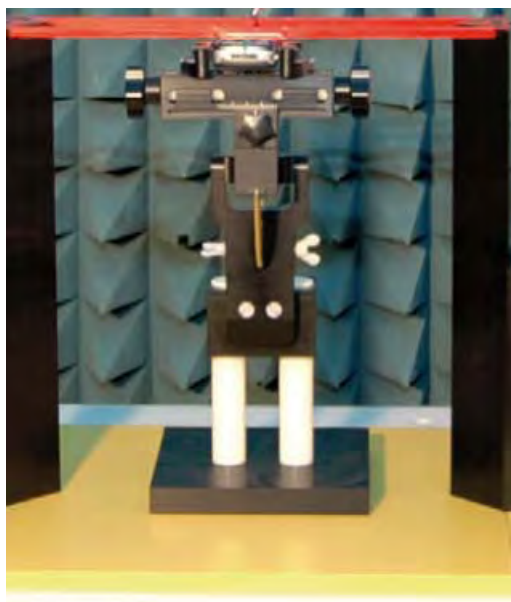


Figure 3 HAC Phantom & Device Holder

5.3 RF Test Procedures

The evaluation was performed with the following procedure:

1. Confirm proper operation of the field probe, probe measurement system and other instrumentation and the positioning system.
2. Position the WD in its intended test position. The gauge block can simplify this positioning. Note that a separate E-field gauge block will be needed if the center of the probe sensor elements is at different distances from the tip of the probe.
3. Configure the WD normal operation for maximum rated RF output power, at the desired channel and other operating parameters (e.g., test mode), as intended for the test.
4. The center sub-grid shall center on the center of the axial measurement point or the acoustic output, as appropriate. Locate the field probe at the initial test position in the 50 mm by 50 mm grid, which is contained in the measurement plane. If the field alignment method is used, align the probe for maximum field reception.
5. Record the reading.
6. Scan the entire 50 mm by 50 mm region in equally spaced increments and record the reading at each measurement point. The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids. The distance between measurement points shall be sufficient to assure the identification of the maximum reading.
7. Identify the five contiguous sub-grids around the center sub-grid with the lowest maximum field strength readings. Thus the six areas to be used to determine the WD's highest emissions are identified and outlined for the final manual scan. Please note that a maximum of five blocks can be excluded for both E-field measurements for the WD output being measured. Stated another way, the center sub-grid and three others must be common to both the E-field measurements.
8. Identify the maximum field reading within the non-excluded sub-grids identified in Step 7.
9. Convert the maximum field strength reading identified in Step 8 to V/m or A/m, as appropriate. For probes which require a probe modulation factor, this conversion shall be done using the appropriate probe modulation factor and the calibration.
10. Repeat Step 1 through Step 10 for both the E-field measurements.
11. Compare this reading to the categories in ANSI C63.19 Clause 8 and record the resulting category. The lowest category number listed in 8.2, Table 8.3 obtained in Step 10 for either E-field determines the M category for the audio coupling mode assessment. Record the WD category rating.



Figure 4 WD reference and plane for RF emission measurements

5.4 System Check

Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI C63.19 D.11 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical output. Position the E-field probe so that:

The probes and their cables are parallel to the coaxial feed of the dipole antenna.

The probe cables and the coaxial feed of the dipole antenna approach the measurement area from opposite directions.

Position the E-field probe at a 15 mm distance from the center of the probe element to the top surface. Validation was performed to verify that measured E-field is within +/-18% from the target reference values provided by the manufacturer. "Values within +/-18% are acceptable. Of which 12% is deviation and 13% is measurement uncertainty."

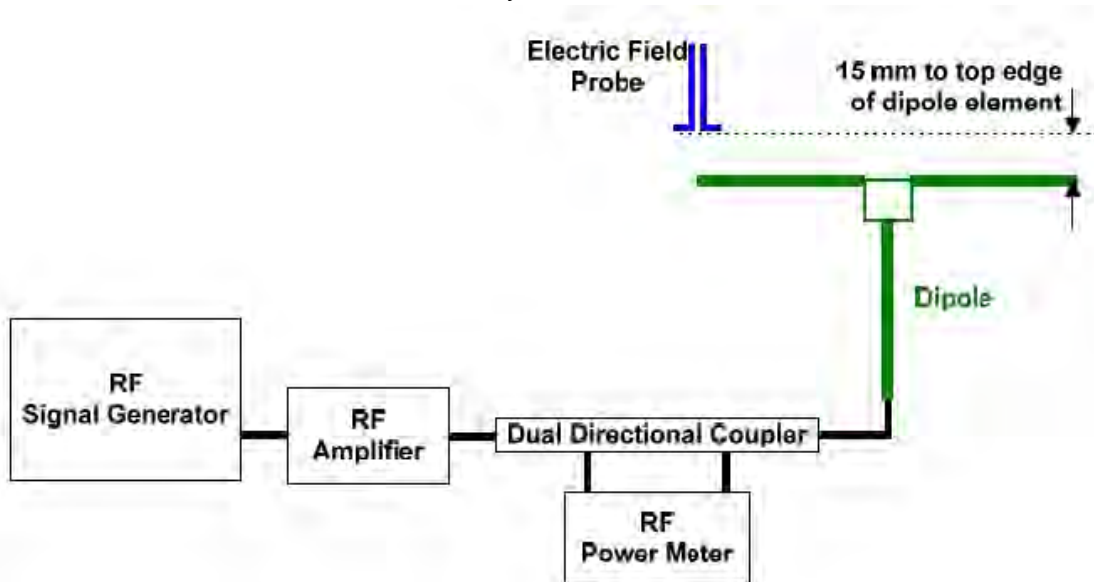


Figure 5 Dipole Validation Setup

Frequency (MHz)	Input Power (mW)	Target ¹ Value (V/m)	Measured ² Value (V/m)	Deviation ³ (%)	Test Date
835	100	106.6	107.3	-0.65	2020/3/2
1880	100	90.5	92.1	1.77	2020/3/2

5.5 Modulation Interference Factor

For any specific fixed and repeatable modulated signal, a modulation interference factor (MIF, expressed in dB) may be developed that relates its interference potential to its steady-state rms signal level or average power level. This factor is a function only of the audio-frequency amplitude modulation characteristics of the signal and is the same for field-strength and conducted power measurements. It is important to emphasize that the MIF is valid only for a specific repeatable audio-frequency amplitude modulation characteristic. Any change in modulation characteristic requires determination and application of a new MIF

The MIF may be determined using a radiated RF field or a conducted RF signal,

- b) Using RF illumination or conducted coupling, apply the specific modulated signal in question to the measurement system at a level within its confirmed operating dynamic range.
- c) Measure the steady-state rms level at the output of the fast probe or sensor.
- d) Measure the steady-state average level at the weighting output.
- e) Without changing the square-law detector or weighting system, and using RF illumination or conducted coupling, substitute for the specific modulated signal a 1kHz, 80% amplitude modulated carrier at the same frequency and adjust its strength until the level at the weighting output equals the step d) measurement.
- f) Without changing the carrier level from step e), remove the 1 kHz modulation and again measure the steady-state ms level indicated at the output of the fast probe or sensor.
- g) The MIF for the specific modulation characteristic is provided by the ratio of the step f) measurement to the step c) measurement, expressed in dB (20 x log(step f)/step c)).

Based on the KDB285076 D01v05, the handset can also use the MIF values predetermined by the test equipment manufacturer, and the following table lists the MIF values evaluated by DASY manufacturer (SPEAG), and the test result will be calculated with the MIF parameter automatically.

SPEAG UID	UID version	Communication system	MIF(dB)
10011	CAB	UMTS-FDD (WCDMA)	-27.23
10021	DAC	GSM-FDD (TDMA, GMSK)	3.63
10061	CAB	IEEE 802.11bWi-Fi 2.4 GHz	-2.02
10077	CAB	IEEE 802.11g Wi-Fi 2.4 GHz	0.12
10170	CAD	LTE-FDD (SC-FDMA, 1RB, 20MHz, 16QAM)	-9.76
10176	CAE	LTE-FDD (SC-FDMA, 1RB, 10MHz, 16QAM)	-9.76
10178	CAE	LTE-FDD (SC-FDMA, 1RB, 5MHz, 16QAM)	-9.76
10182	CAD	LTE-FDD (SC-FDMA, 1RB, 15MHz, 16QAM)	-9.76
10185	CAD	LTE-FDD (SC-FDMA, 1RB, 3MHz, 16QAM)	-9.76
10188	CAE	LTE-FDD (SC-FDMA, 1RB, 1.4MHz, 16QAM)	-9.76
10172	CAD	LTE-FDD (SC-FDMA, 1RB, 20MHz, QPSK)	-1.62
10591	AAA	IEEE 802.11n HT20	-5.59
10599	AAA	IEEE 802.11n HT40	-5.59
10062	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	-5.82
10063	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	-5.14
10064	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	-4.67



10065	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	-4.00
10066	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	-3.55
10067	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	-3.20
10068	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	-3.16
10069	CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	-3.15
10317	AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	-9.82
10400	AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	-17.01
10401	AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	-15.53
10402	AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	-28.95

5.6 Justification of Held to Ear Modes Tested

5.6.1 Analysis of RF Air Interface Technologies

a. According to the April 2013 TCB workshop slides, LTE and other OTT data services are outside the current definition of a managed CMRS service and are currently not required to be evaluated.

b. No associated T-coil measurements for VoIP over WIFI CMRS have been made in accordance with the guidance issued by OET in KDB publication 285076 D02 T-Coil testing for CMRS IP.

c. An analysis was performed, following the guidance of 4.3 and 4.4 of the ANSI standard, of the RF air interface technologies being evaluated. The factors that will affect the RF interference potential were evaluated, and the worst case operating modes were identified and used in the evaluation. A WD's interference potential is a function both of the WD's average near-field field strength and of the signal's audio-frequency amplitude modulation characteristics. Per 4.4, RF air interface technologies that have low power have been found to produce sufficiently low RF interference potential, So it is possible to exempt them from the product testing specified in Clause 5 of the ANSI standard. An RF air interface technology of a device is exempt from testing when its average antenna input power plus its MIF is <17dBm for all of its operating modes. RF air interface technologies exempted from testing in this manner are automatically assigned an M4 rating to be used in determining the overall rating for the WD.

The worst case MIF plus the worst case average antenna input power for all modes are investigated below to determine the testing requirements for this device.

5.6.2 Average Antenna Input Power & Evaluation for Low-power Exemption

An RF air interface technology of a device is exempt from testing when its average antenna input power plus its **MIF is ≤ 17 dBm** for any of its operating modes. If a device supports multiple RF air interfaces, each RF air interface shall be evaluated individually.

Band	Maximum Average Antenna Input Power (dBm)	Worst Case MIF (dB)	Maximum Average Antenna Input Power + MIF (dBm)	Low power exemption
GSM 850	34.00	3.63	37.63	No
GSM 1900	31.50	3.63	35.13	No
WCDMA Band II	24.50	-27.23	-2.73	Yes
WCDMA Band IV	24.50	-27.23	-2.73	Yes
WCDMA Band V	24.50	-27.23	-2.73	Yes
LTE FDD 2	24.00	-9.76	14.24	Yes
LTE FDD 4	24.00	-9.76	14.24	Yes
LTE FDD 5	24.00	-9.76	14.24	Yes
LTE FDD 7	24.00	-9.76	14.24	Yes
LTE FDD 12	24.00	-9.76	14.24	Yes



LTE FDD 13	24.00	-9.76	14.24	Yes
LTE FDD 17	24.00	-9.76	14.24	Yes
LTE FDD 66	24.00	-9.76	14.24	Yes
WIFI2.4G: 802.11b	14.00	-2.02	11.98	Yes
WIFI2.4G: 802.11g	14.00	0.12	14.12	Yes
WIFI2.4G: 802.11n20HT	14.00	-5.59	8.41	Yes
WIFI2.4G: 802.11n40HT	14.00	-5.59	8.41	Yes
WIFI5G: 802.11a	16.50	-3.15	13.35	Yes
WIFI5G: 802.11n20HT	15.50	-5.59	9.91	Yes
WIFI5G: 802.11n40HT	15.50	-5.59	9.91	Yes
WIFI5G: 802.11ac20VHT	14.50	-5.60	8.90	Yes
WIFI5G: 802.11ac40VHT	14.50	-5.57	8.93	Yes
WIFI5G: 802.11ac80VHT	14.50	-5.64	8.86	Yes

Note: 1. MIF values applied in this test report were provided by the HAC equipment provider, SPEAG.



6 Test Results

6.1 ANSI C63.19-2011 Limits

Category	Telephone RF parameters < 960 MHz	Telephone RF parameters > 960 MHz
Near field	E-field emissions	
Category M1	50 to 55 dB (V/m)	40 to 45 dB (V/m)
Category M2	45 to 50 dB (V/m)	35 to 40 dB (V/m)
Category M3	40 to 45 dB (V/m)	30 to 35 dB (V/m)
Category M4	< 40 dB (V/m)	< 30 dB (V/m)



6.2 Summary Test Results

Band	Channel /Frenqucy (MHz)	MIF (dB)	E-field (dBV/m)	Power Drift (dB)	Category	Graph Results
GSM 850	128/824.2	3.63	38.97	-0.05	M4	1
	190/836.6	3.63	39.27	0.00	M4	2
	251/848.8	3.63	39.35	-0.02	M4	3
GSM 1900	512/1850.2	3.63	26.68	0.13	M4	4
	661/1880	3.63	28.10	0.05	M4	5
	810/1909.8	3.63	27.94	-0.08	M4	6



7 Measurement Uncertainty

Measurement uncertainty evaluation template for DUT HAC RF test

Error source	Type	Uncertainty Value (\pm %)	Prob. Dist.	k	c_i/E	c_i/H	Standard Uncertainty u_i (\pm %)	Degree of freedom v_{eff} or v_i
Measurement system								
Probe Calibration	B	5.1	N	1	1	1	5.1	∞
Axial Isotropy	B	4.7	R	1.732	1	1	2.7	∞
Sensor Displacement	B	16.5	R	1.732	1	0.145	9.5	∞
Boundary Effects	B	2.4	R	1.732	1	1	1.4	∞
Test Arch	B	7.2	R	1.732	1	0	4.2	∞
Linearity	B	4.7	R	1.732	1	1	2.7	∞
Scaling to Peak Envelope Power	B	2.0	R	1.732	1	1	1.2	∞
System Detection Limit	B	1.0	R	1.732	1	1	0.6	∞
Readout Electronics	B	0.3	N	1	1	1	0.3	∞
Response Time	B	0.8	R	1.732	1	1	0.5	∞
Integration Time	B	2.6	R	1.732	1	1	1.5	∞
RF Ambient Conditions	B	3.0	R	1.732	1	1	1.7	∞
RF Reflections	B	12.0	R	1.732	1	1	6.9	∞
Probe Positioner	B	1.2	R	1.732	1	0.67	0.7	∞
Probe Positioning	A	4.7	R	1.732	1	0.67	2.7	∞
Extra. And Interpolation	B	1.0	R	1.732	1	1	0.6	∞
Test sample related								
Device Positioning Vertical	B	4.7	R	1.732	1	0.67	2.7	∞
Device Positioning Lateral	B	1.0	R	1.732	1	1	0.6	∞
Device Holder and Phantom	B	2.4	R	1.732	1	1	1.4	∞
Power Drift	B	5.0	R	1.732	1	1	2.9	∞
Phantom and Setup related								
Phantom Thickness	B	2.4	R	1.732	1	0.67	1.4	∞
Combined standard uncertainty (%)							15.3	
Expanded Std. uncertainty on power (K=2)							30.6	
Expanded Std. uncertainty on field (K=2)							15.3	



8 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Power meter	Agilent	E4417A	GB41291714	2019-05-19	2020-05-18
Power sensor	Agilent	N8481H	MY50350004	2019-05-19	2020-05-18
Signal Generator	Agilent	N5181A	MY50140143	2019-05-19	2020-05-18
Amplifier	INDEXSAR	IXA-020	0401	2019-05-19	2020-05-18
Wideband radio communication tester	R&S	CMW500	146734	2019-05-19	2020-05-18
E-Field Probe	SPEAG	EF3DV3	4062	2019-12-13	2020-12-12
DAE	SPEAG	DAE4	1317	2019-10-23	2020-10-22
Validation Kit 835MHz	SPEAG	CD835V3	1133	2017-11-22	2020-11-21
Validation Kit 1880MHz	SPEAG	CD1880V3	1115	2017-11-22	2020-11-21
Hygrothermograph	Anymetr	NT-311	20150731	2019-05-19	2020-05-18
HAC Phantom	SPEAG	SD HAC P01 BB	1117	2017-11-22	2020-11-21
Software for Test	Speag	DASY52	/	/	/
Software for Tissue	Agilent	85070	/	/	/

*****END OF REPORT *****

ANNEX A: System Check Results

HAC_System Performance Check at 835MHz_E

DUT: Dipole 835 MHz; Type: CD835V3; SN:1023

Date: 2020/3/2

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 0mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

E Scan - measurement distance from the probe sensor center to CD835 Dipole = 15mm

2/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 91 V/m; Power Drift = 0.003 dB

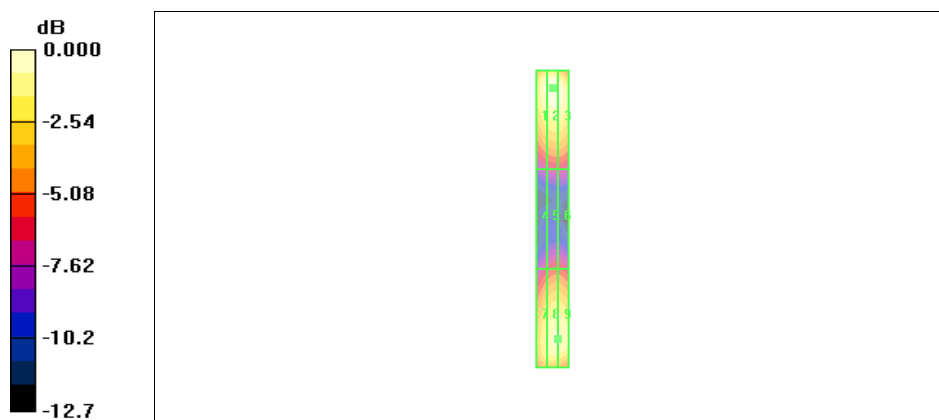
Applied MIF = 0.00 dB

Maximum value of peak Total field = 107.3 V/m

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 101.2 M4	Grid 2 104.3 M4	Grid 3 101.5 M4
Grid 4 61.2 M4	Grid 5 64.23 M4	Grid 6 62.39 M4
Grid 7 104.5 M4	Grid 8 107.3 M4	Grid 9 104.3 M4



0 dB = 107.3V/m

HAC_System Performance Check at 1880MHz_E

DUT: Dipole 1880 MHz; Type: CD1880V3; SN: 1018

Date: 2020/3/2

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 0mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 15mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 86V/m; Power Drift = 0.002 dB

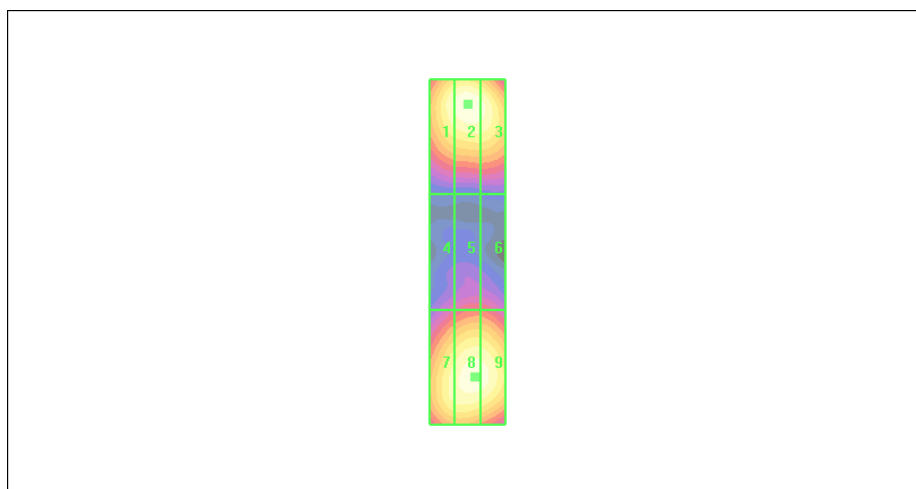
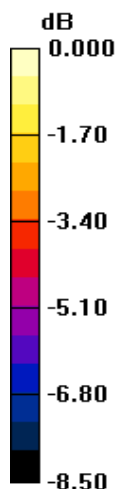
Applied MIF = 0.00 dB

Maximum value of peak Total field = 92.1 V/m

Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 91.78 M2	Grid 2 98.10 M2	Grid 3 93.42M2
Grid 4 71.76 M3	Grid 5 73.56 M3	Grid 6 71.17 M3
Grid 7 87.15 M2	Grid 8 89.46 M2	Grid 9 89.01 M2



0 dB = 98.10V/m

ANNEX B: Graph Results

Plot 1 HAC RF E-Field GSM 850 Low

Date: 2020/3/2

Communication System: UID 10021 - DAC, GSM-FDD (TDMA, GMSK); Frequency: 824.2 MHz; Duty Cycle: 1:8.6896

Medium parameters used: $\sigma = 0$ S/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

M528SKU2 GSM850 HAC RF E-Field/E Scan - ER3D: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 79.55 V/m; Power Drift = -0.05 dB

Applied MIF = 3.63 dB

RF audio interference level = 38.97 dBV/m

Emission category: M4

MIF scaled E-field

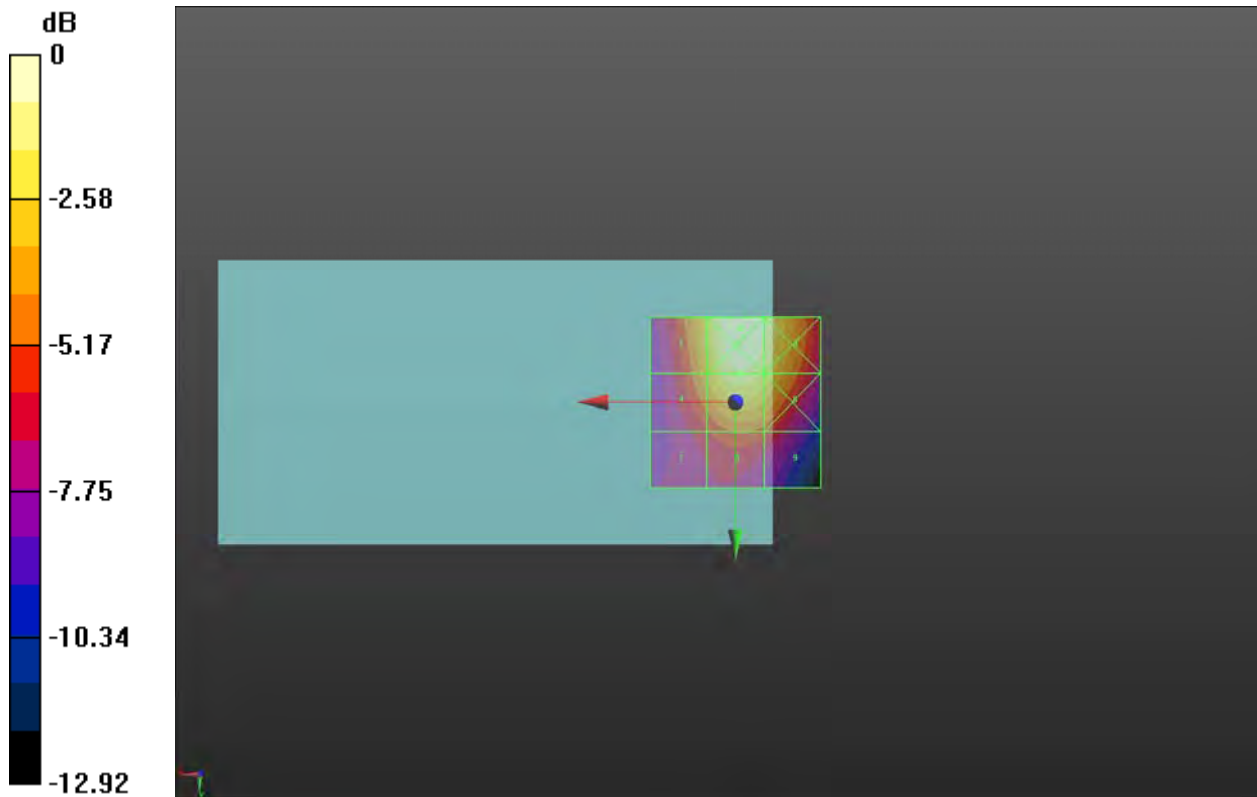
Grid 1 M4 37.43 dBV/m	Grid 2 M4 39.95 dBV/m	Grid 3 M4 39.16 dBV/m
Grid 4 M4 36.44 dBV/m	Grid 5 M4 38.97 dBV/m	Grid 6 M4 38.12 dBV/m
Grid 7 M4 33.8 dBV/m	Grid 8 M4 34.93 dBV/m	Grid 9 M4 34.33 dBV/m

Cursor:

Total = 39.95 dBV/m

E Category: M4

Location: -1.5, -21.5, 7.7 mm



0 dB = 99.45 V/m = 39.95 dBV/m

**Plot 2 HAC RF E-Field GSM 850 Middle**

Date: 2020/3/2

Communication System: UID 10021 - DAC, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz; Duty Cycle: 1:8.6896

Medium parameters used: $\sigma = 0$ S/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

M528SKU2 GSM850 HAC RF E-Field/E Scan - ER3D: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 82.34 V/m; Power Drift = 0.00 dB

Applied MIF = 3.63 dB

RF audio interference level = 39.27 dBV/m

Emission category: M4

MIF scaled E-field

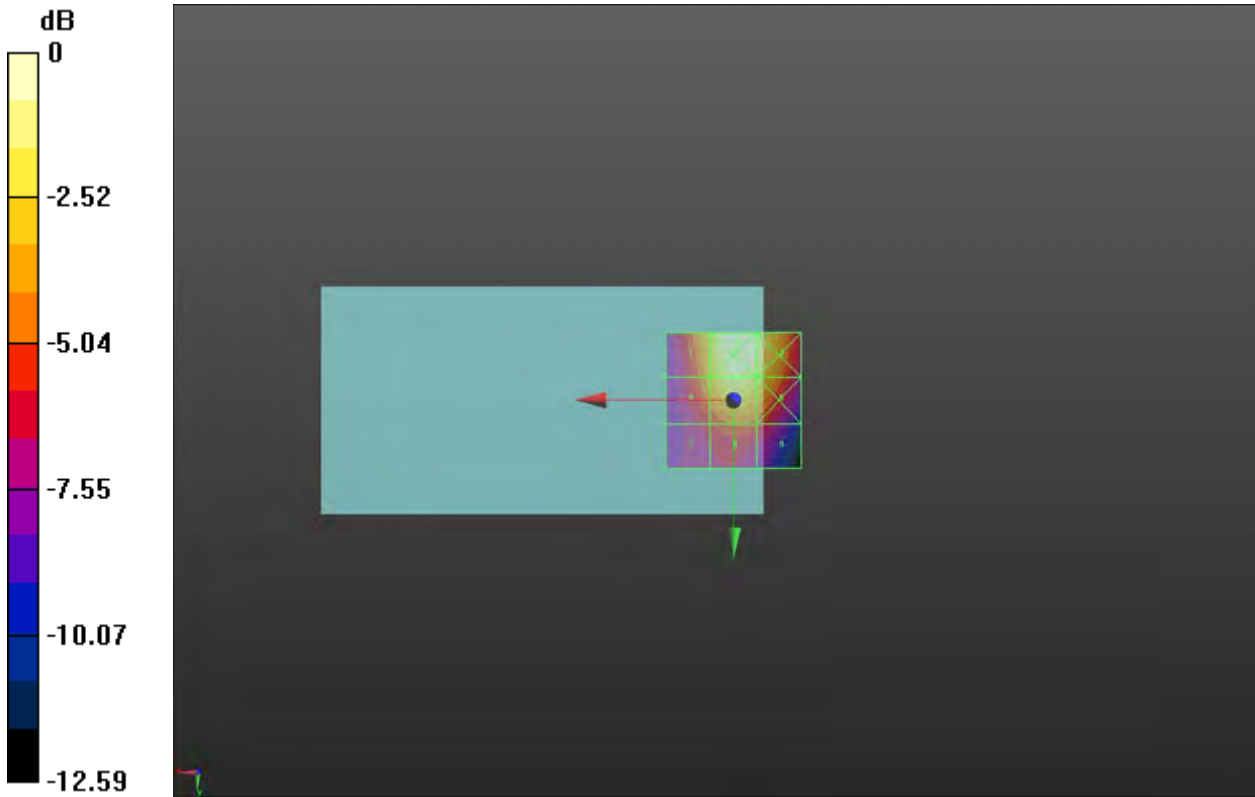
Grid 1 M4 37.73 dBV/m	Grid 2 M3 40.22 dBV/m	Grid 3 M4 39.41 dBV/m
Grid 4 M4 36.78 dBV/m	Grid 5 M4 39.27 dBV/m	Grid 6 M4 38.39 dBV/m
Grid 7 M4 34.23 dBV/m	Grid 8 M4 35.34 dBV/m	Grid 9 M4 34.73 dBV/m

Cursor:

Total = 40.22 dBV/m

E Category: M3

Location: -1.5, -21.5, 7.7 mm



0 dB = 102.6 V/m = 40.22 dBV/m

**Plot 3 HAC RF E-Field GSM 850 High**

Date: 2020/3/2

Communication System: UID 10021 - DAC, GSM-FDD (TDMA, GMSK); Frequency: 848.6 MHz; Duty Cycle: 1:8.6896

Medium parameters used: $\sigma = 0$ S/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

M528SKU2 GSM850 HAC RF E-Field/E Scan - ER3D: 15 mm from Probe Center to the Device**High/Hearing Aid Compatibility Test (101x101x1):** Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 84.00 V/m; Power Drift = -0.02 dB

Applied MIF = 3.63 dB

RF audio interference level = 39.35 dBV/m

Emission category: M4

MIF scaled E-field

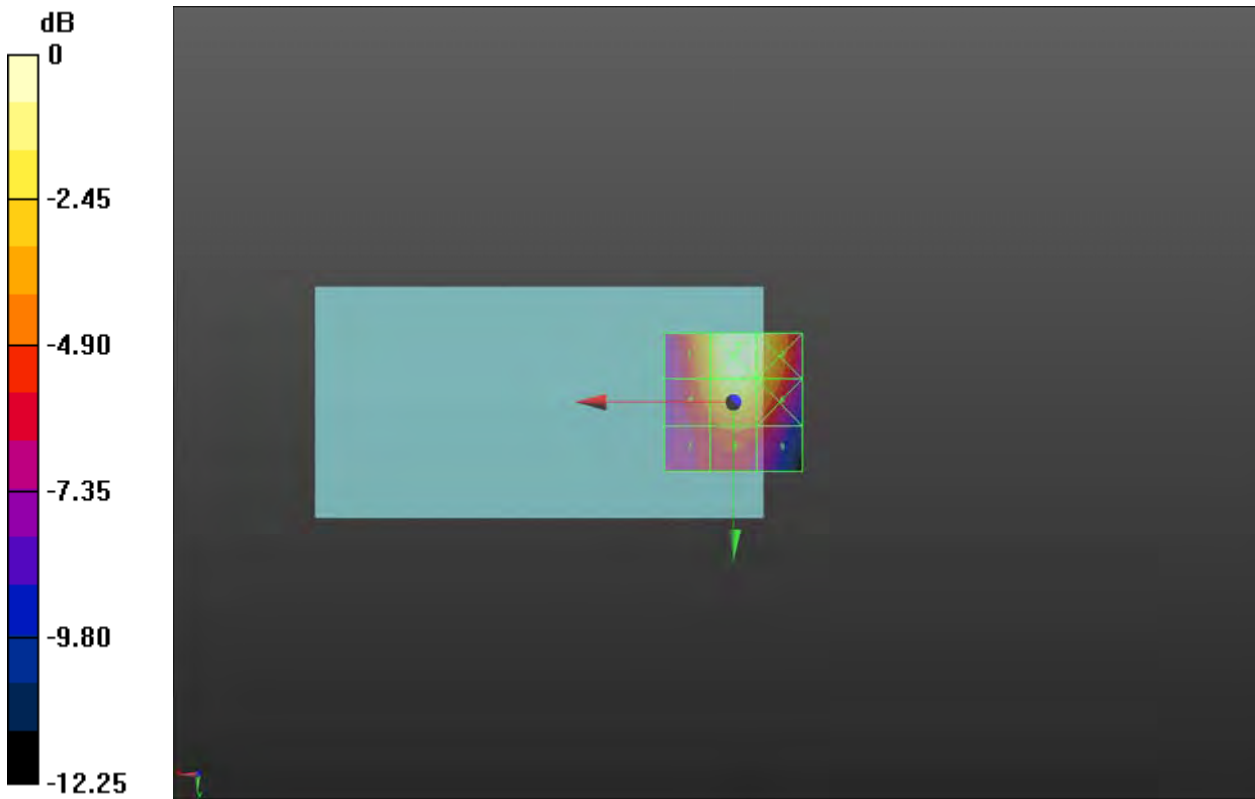
Grid 1 M4 37.82 dBV/m	Grid 2 M3 40.2 dBV/m	Grid 3 M4 39.32 dBV/m
Grid 4 M4 37.04 dBV/m	Grid 5 M4 39.35 dBV/m	Grid 6 M4 38.34 dBV/m
Grid 7 M4 34.69 dBV/m	Grid 8 M4 35.67 dBV/m	Grid 9 M4 34.95 dBV/m

Cursor:

Total = 40.20 dBV/m

E Category: M3

Location: -1.5, -21, 7.7 mm



0 dB = 102.3 V/m = 40.20 dBV/m

**Plot 4 HAC RF E-Field GSM 1900 Low**

Date: 2020/3/2

Communication System: UID 10021 - DAC, GSM-FDD (TDMA, GMSK); Frequency: 1850.2 MHz; Duty Cycle: 1:8.6896

Medium parameters used: $\sigma = 0$ S/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

M528SKU2 GSM1900 HAC RF E-Field/E Scan - ER3D: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 17.73 V/m; Power Drift = 0.13 dB

Applied MIF = 3.63 dB

RF audio interference level = 26.68 dBV/m

Emission category: M4

MIF scaled E-field

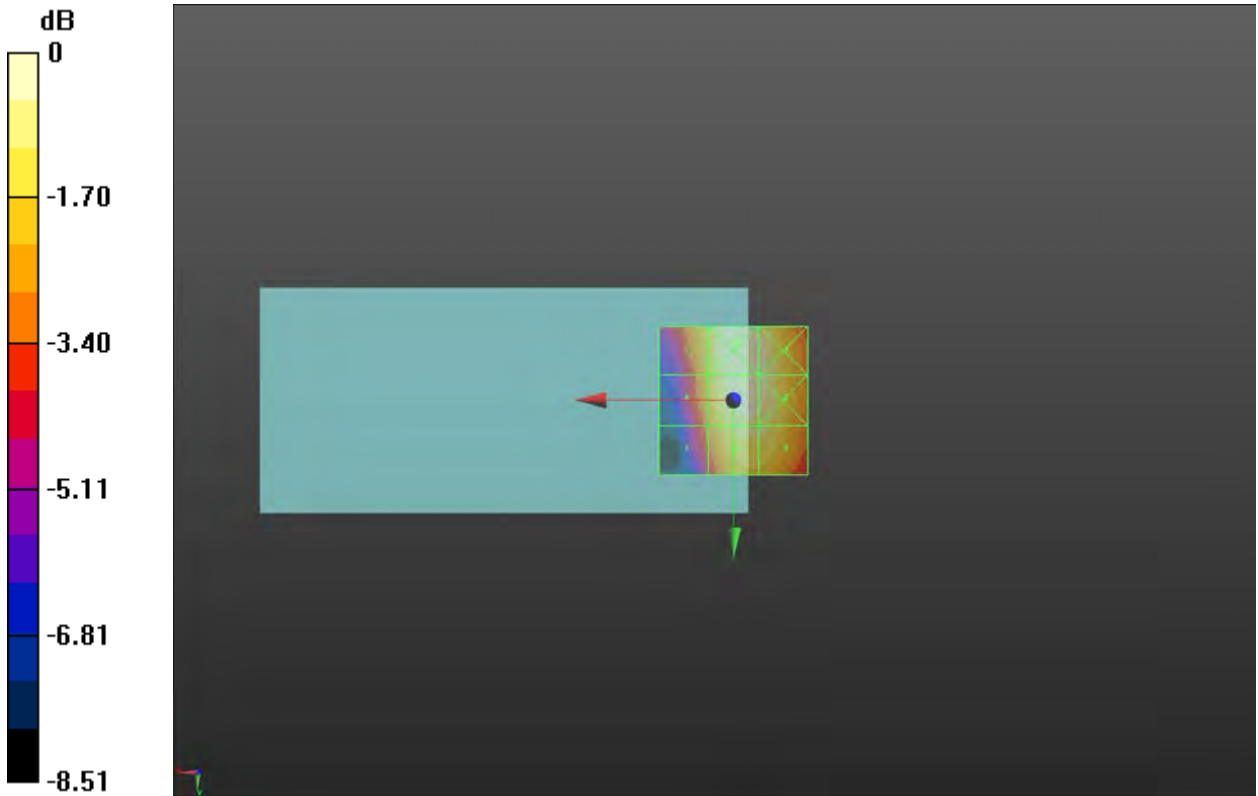
Grid 1 M4 25.38 dBV/m	Grid 2 M4 26.78 dBV/m	Grid 3 M4 26.51 dBV/m
Grid 4 M4 24.83 dBV/m	Grid 5 M4 26.68 dBV/m	Grid 6 M4 26.57 dBV/m
Grid 7 M4 23.89 dBV/m	Grid 8 M4 26.02 dBV/m	Grid 9 M4 25.94 dBV/m

Cursor:

Total = 26.78 dBV/m

E Category: M4

Location: -1, -20, 7.7 mm



0 dB = 21.84 V/m = 26.79 dBV/m

**Plot 5 HAC RF E-Field GSM 1900 Middle**

Date: 2020/3/2

Communication System: UID 10021 - DAC, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz; Duty Cycle: 1:8.6896

Medium parameters used: $\sigma = 0$ S/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

M528SKU2 GSM1900 HAC RF E-Field/E Scan - ER3D: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 20.73 V/m; Power Drift = 0.05 dB

Applied MIF = 3.63 dB

RF audio interference level = 28.10 dBV/m

Emission category: M4

MIF scaled E-field

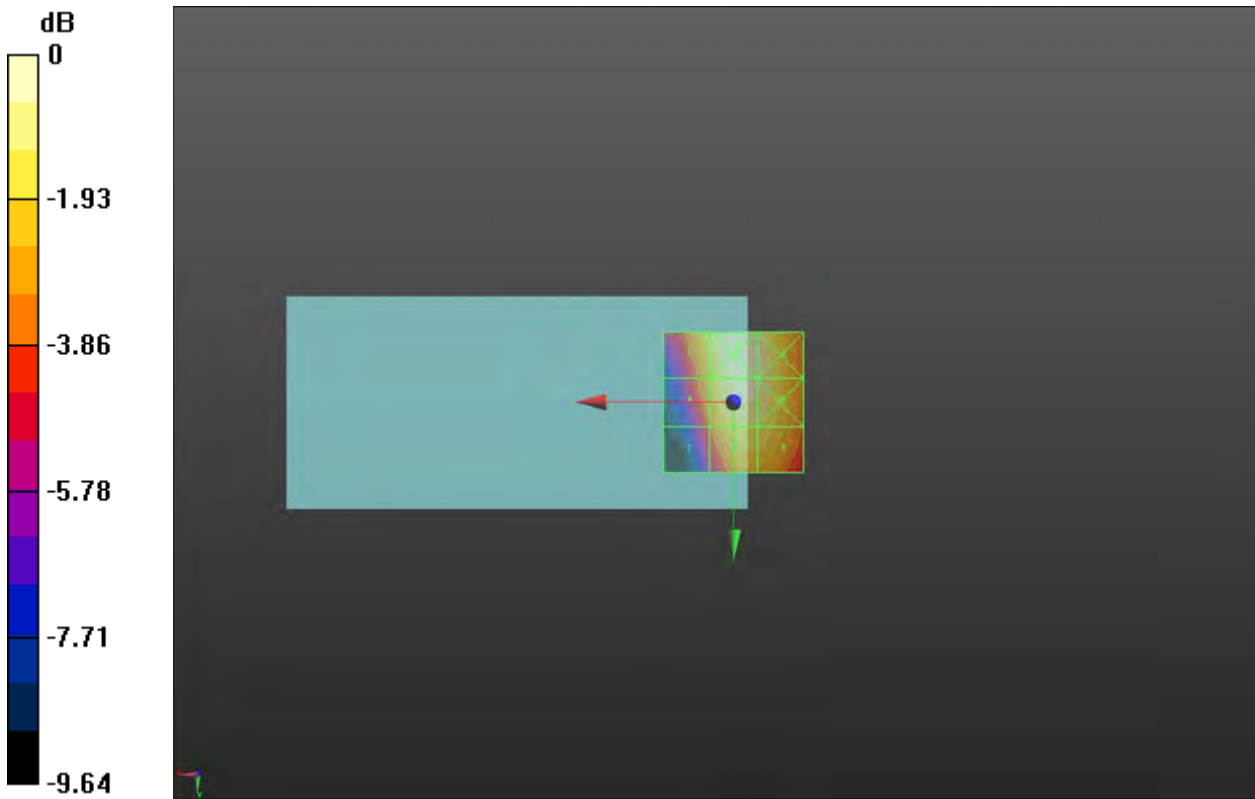
Grid 1 M4 27.15 dBV/m	Grid 2 M4 28.38 dBV/m	Grid 3 M4 27.93 dBV/m
Grid 4 M4 26.11 dBV/m	Grid 5 M4 28.1 dBV/m	Grid 6 M4 27.87 dBV/m
Grid 7 M4 24.57 dBV/m	Grid 8 M4 27.13 dBV/m	Grid 9 M4 27.08 dBV/m

Cursor:

Total = 28.38 dBV/m

E Category: M4

Location: -1.5, -20.5, 7.7 mm



0 dB = 26.25 V/m = 28.38 dBV/m

**Plot 6 HAC RF E-Field GSM 1900 High**

Date: 2020/3/2

Communication System: UID 10021 - DAC, GSM-FDD (TDMA, GMSK); Frequency: 1909.8 MHz; Duty Cycle: 1:8.6896

Medium parameters used: $\sigma = 0$ S/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EF3DV3 - SN4062; ConvF(1, 1, 1); Calibrated: 2019/12/13

Electronics: DAE4 SN1317; Calibrated: 2019/10/23

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

M528SKU2 GSM1900 HAC RF E-Field/E Scan - ER3D: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 19.99 V/m; Power Drift = -0.08 dB

Applied MIF = 3.63 dB

RF audio interference level = 27.94 dBV/m

Emission category: M4

MIF scaled E-field

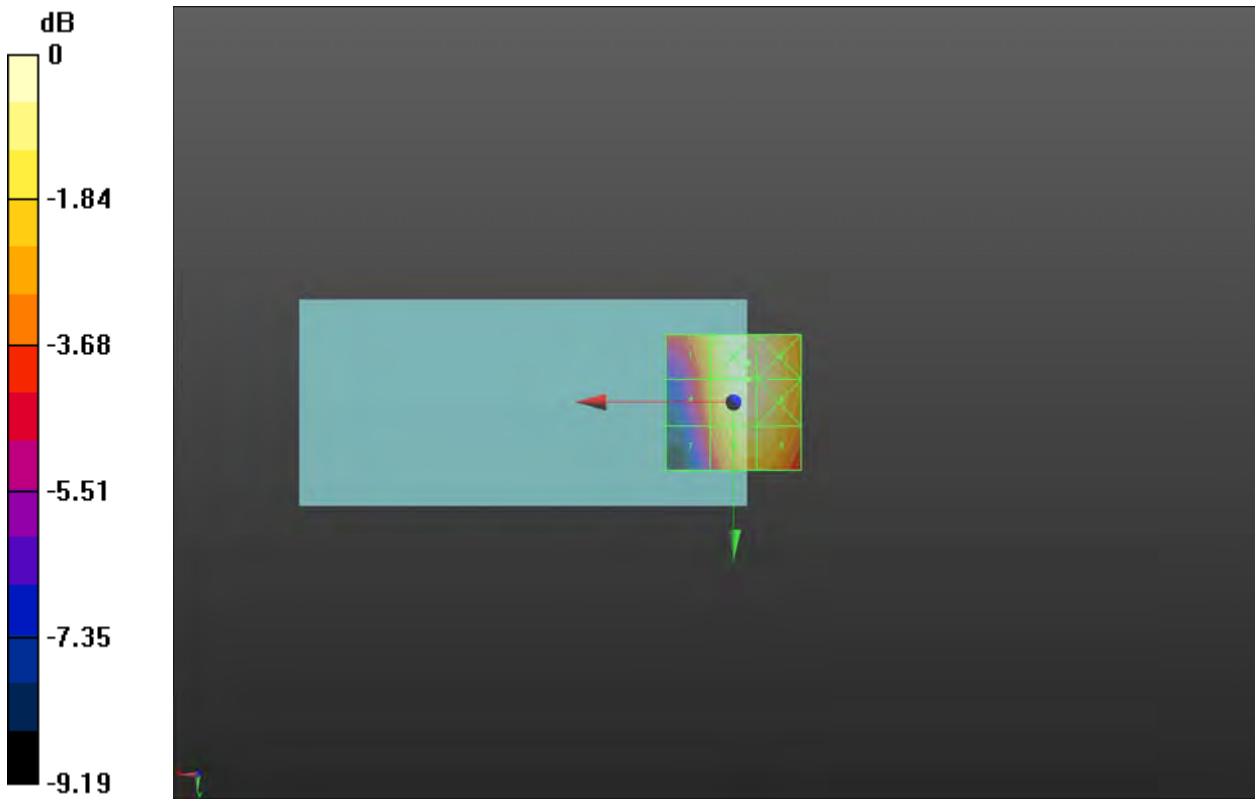
Grid 1 M4 26.53 dBV/m	Grid 2 M4 28.01 dBV/m	Grid 3 M4 27.87 dBV/m
Grid 4 M4 25.6 dBV/m	Grid 5 M4 27.94 dBV/m	Grid 6 M4 27.84 dBV/m
Grid 7 M4 24.57 dBV/m	Grid 8 M4 27.17 dBV/m	Grid 9 M4 27.12 dBV/m

Cursor:

Total = 28.01 dBV/m

E Category: M4

Location: -5.5, -14.5, 7.7 mm



0 dB = 25.13 V/m = 28.00 dBV/m



ANNEX C: E-Probe Calibration Certificate

**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Auden**

Certificate No: **EF3-4062_Dec19**

CALIBRATION CERTIFICATE

Object **EF3DV3- SN:4062**

Calibration procedure(s) **QA CAL-02.v9, QA CAL-25.v7
Calibration procedure for E-field probes optimized for close near field
evaluations in air.**

Calibration date: **December 13, 2019**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 789	14-Jan-19 (No. DAE4-789_Jan19)	Jan-20
Reference Probe ER3DV6	SN: 2328	05-Oct-19 (No. ER3-2328_Oct19)	Oct-20
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-19)	In house check: Oct-20

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: December 13, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

NORM _{x,y,z}	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
En	incident E-field orientation normal to probe axis
Ep	incident E-field orientation parallel to probe axis
Polarization φ	φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., θ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005
- b) CTIA Test Plan for Hearing Aid Compatibility, Rev 3.1.1, May 2017

Methods Applied and Interpretation of Parameters:

- **NORM_{x,y,z}**: Assessed for E-field polarization θ = 0 for XY sensors and θ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- **NORM(f)_{x,y,z} = NORM_{x,y,z} * frequency_response** (see Frequency Response Chart).
- **DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- **PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- **A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}; A, B, C, D** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- **Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- **Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- **Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).



EF3DV3 – SN:4062

December 13, 2019

DASY/EASY - Parameters of Probe: EF3DV3 - SN:4062**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$)	0.71	0.78	1.21	$\pm 10.1\%$
DCP (mV) ^B	98.9	96.1	94.6	

Calibration results for Frequency Response (30 MHz – 6 GHz)

Frequency MHz	Target E-Field V/m	Measured E-field (En) V/m	Deviation E-normal in %	Measured E-field (Ep) V/m	Deviation E-normal in %	Unc (k=2) %
30	77.4	77.3	-0.1%	77.4	0.0%	$\pm 5.1\%$
100	77.3	78.1	1.1%	78.0	0.9%	$\pm 5.1\%$
450	77.1	77.9	1.0%	77.9	1.0%	$\pm 5.1\%$
600	77.2	77.7	0.6%	77.4	0.3%	$\pm 5.1\%$
750	77.2	77.5	0.4%	77.3	0.2%	$\pm 5.1\%$
1800	143.3	139.4	-2.8%	139.3	-2.8%	$\pm 5.1\%$
2000	135.1	131.5	-2.7%	131.5	-2.7%	$\pm 5.1\%$
2200	127.7	123.7	-3.2%	124.8	-2.3%	$\pm 5.1\%$
2500	125.4	122.5	-2.3%	123.6	-1.5%	$\pm 5.1\%$
3000	79.5	75.9	-4.5%	77.0	-3.2%	$\pm 5.1\%$
3500	256.2	247.8	-3.3%	244.6	-4.5%	$\pm 5.1\%$
3700	250.7	239.9	-4.3%	238.9	-4.7%	$\pm 5.1\%$
5200	49.9	50.8	1.7%	50.8	1.8%	$\pm 5.1\%$
5500	49.6	49.5	-0.1%	48.4	-2.4%	$\pm 5.1\%$
5800	48.9	48.8	-0.1%	49.7	1.7%	$\pm 5.1\%$

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



EF3DV3 – SN:4062

December 13, 2019

DASY/EASY - Parameters of Probe: EF3DV3 - SN:4062

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc ^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	161.8	± 3.8 %	± 4.7 %
		Y	0.00	0.00	1.00		168.7		
		Z	0.00	0.00	1.00		165.7		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	2.66	65.51	9.70	10.00	60.0	± 3.6 %	± 9.6 %
		Y	15.00	84.94	17.37		60.0		
		Z	14.00	84.00	17.00		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	1.64	64.54	8.21	6.99	80.0	± 1.8 %	± 9.6 %
		Y	15.00	87.78	17.27		80.0		
		Z	15.00	88.15	17.29		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.61	61.60	5.99	3.98	95.0	± 2.3 %	± 9.6 %
		Y	15.00	108.69	25.55		95.0		
		Z	15.00	138.96	38.94		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	0.39	62.10	5.65	2.22	120.0	± 1.7 %	± 9.6 %
		Y	15.00	60.00	10.00		120.0		
		Z	0.05	60.00	10.00		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	0.41	60.00	5.19	0.00	150.0	± 3.3 %	± 9.6 %
		Y	0.39	60.00	5.11		150.0		
		Z	0.40	60.00	5.13		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	2.33	70.55	17.36	0.00	150.0	± 1.9 %	± 9.6 %
		Y	3.38	78.45	21.61		150.0		
		Z	3.45	78.83	21.84		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	1.89	65.73	16.96	3.01	150.0	± 4.3 %	± 9.6 %
		Y	1.85	67.93	19.98		150.0		
		Z	1.70	66.58	18.59		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	3.45	67.64	16.31	0.00	150.0	± 2.0 %	± 9.6 %
		Y	3.80	69.78	17.90		150.0		
		Z	3.82	69.81	17.99		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.64	66.05	15.93	0.00	150.0	± 3.5 %	± 9.6 %
		Y	4.83	66.92	16.81		150.0		
		Z	4.86	66.92	16.89		150.0		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



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DASY/EASY - Parameters of Probe: EF3DV3 - SN:4062**Sensor Frequency Model Parameters**

	Sensor X	Sensor Y	Sensor Z
Frequency Corr. (LF)	0.03	0.07	5.02
Frequency Corr. (HF)	2.82	2.82	2.82

Sensor Model Parameters

	C1 fF	C2 fF	α V ⁻¹	T1 ms.V ⁻²	T2 ms.V ⁻¹	T3 ms	T4 V ⁻²	T5 V ⁻¹	T6
X	30.4	198.02	36.07	5.29	0.15	4.95	0.00	0.13	1.00
Y	32.0	215.63	38.72	3.51	0.00	5.06	0.00	0.00	1.01
Z	32.7	224.51	39.93	1.15	0.00	5.07	0.00	0.00	1.00

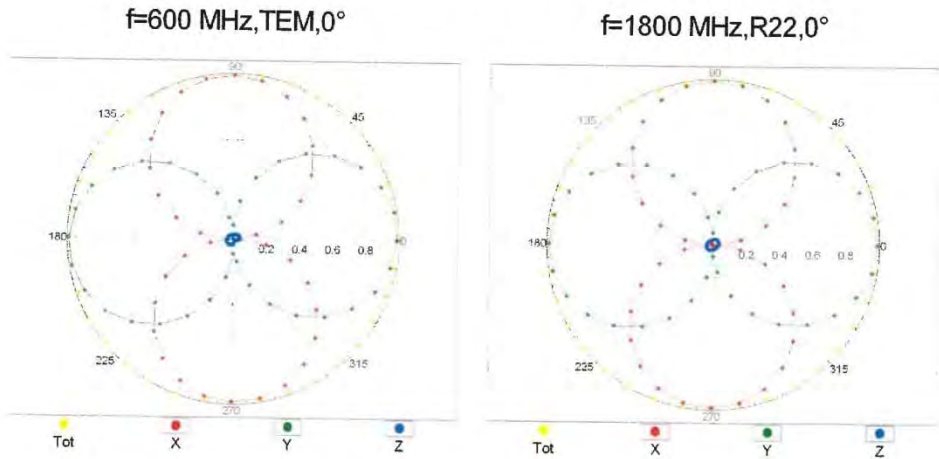
Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	62.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	12 mm
Tip Length	25 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	1.5 mm
Probe Tip to Sensor Y Calibration Point	1.5 mm
Probe Tip to Sensor Z Calibration Point	1.5 mm

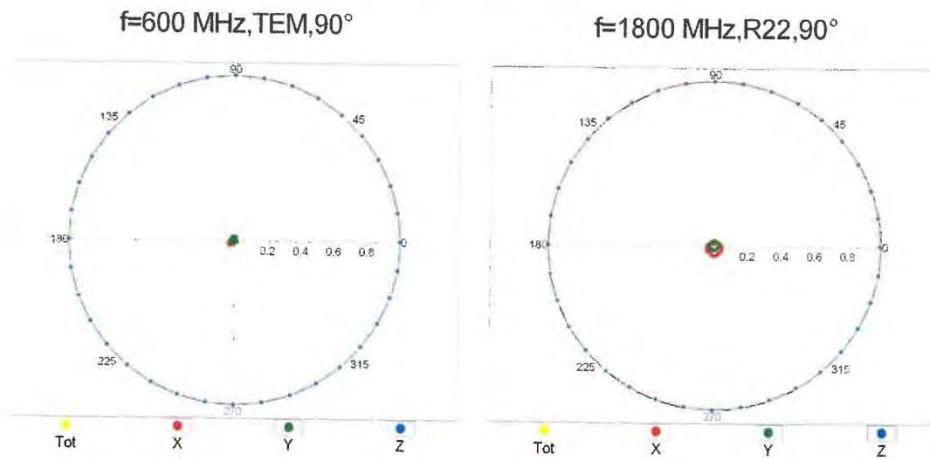
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Receiving Pattern (ϕ), $\vartheta = 0^\circ$



Receiving Pattern (ϕ), $\vartheta = 90^\circ$

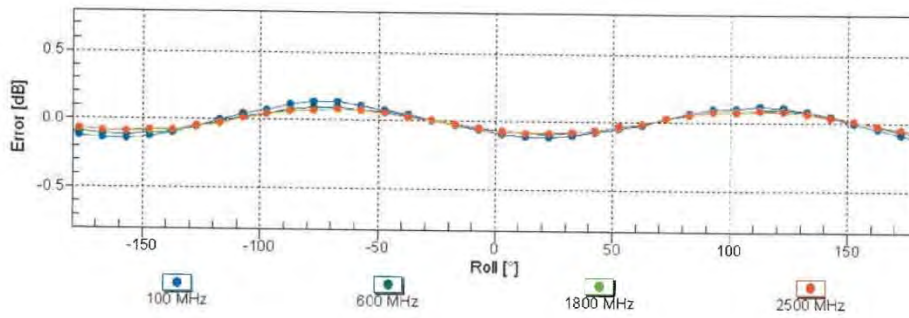




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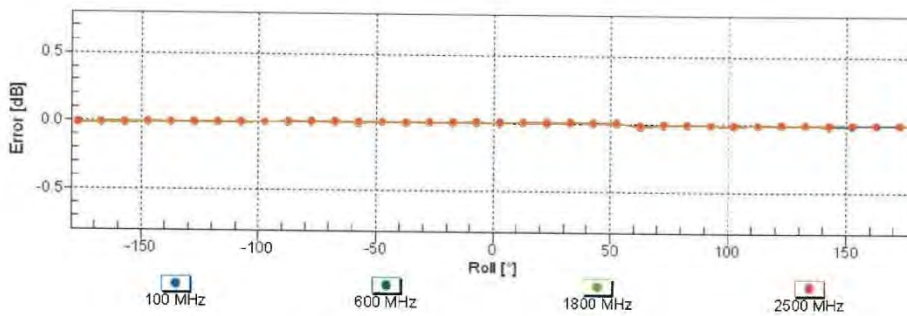
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Receiving Pattern (ϕ), $\vartheta = 0^\circ$



Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 90^\circ$

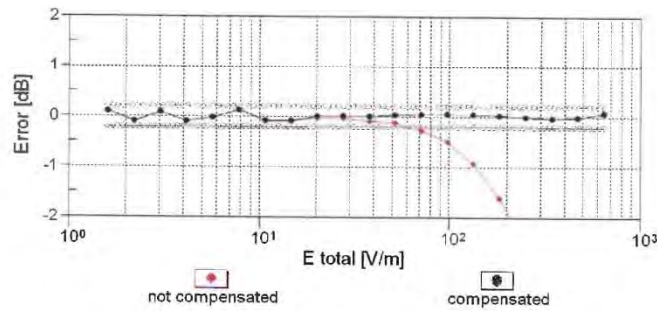
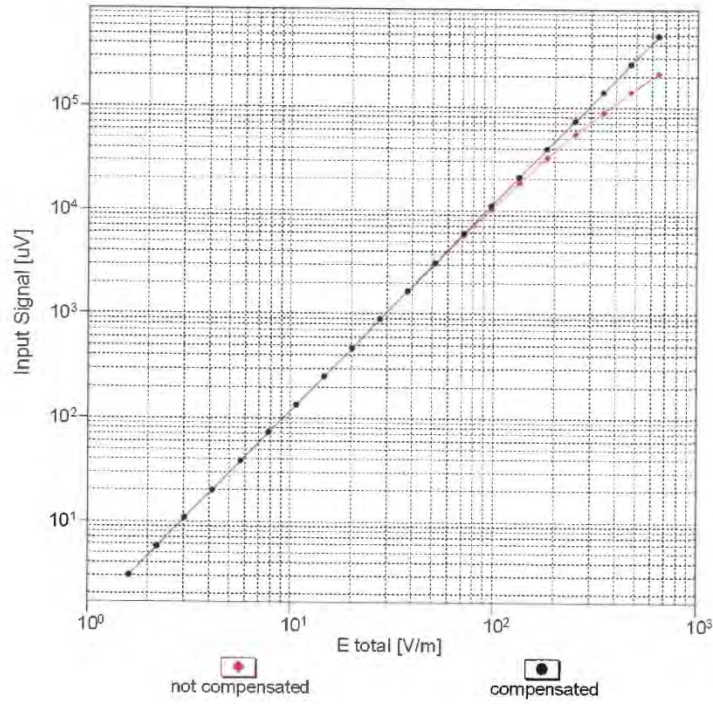


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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Dynamic Range f(E-field) (TEM cell, f = 900 MHz)

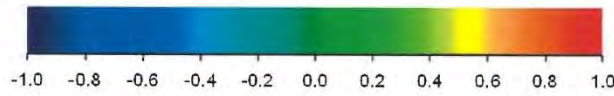
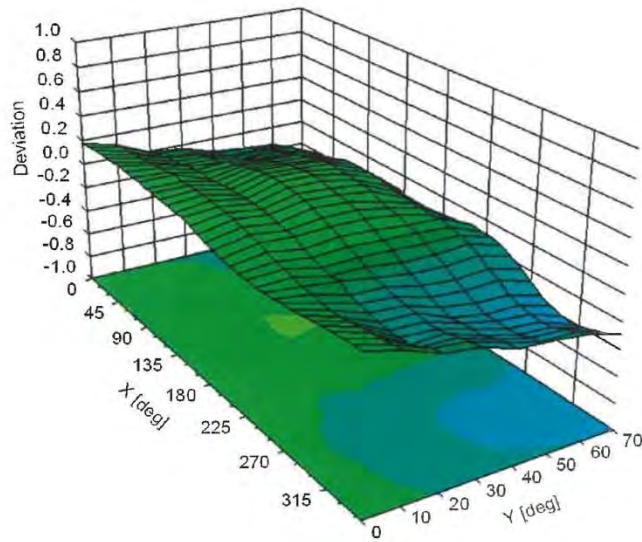


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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Deviation from Isotropy in Air Error (ϕ , θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)



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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E (k=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %



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10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	±9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	±9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	±9.6 %
10114	CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	±9.6 %
10115	CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	±9.6 %
10116	CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	±9.6 %
10117	CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	±9.6 %
10118	CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	±9.6 %
10119	CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	±9.6 %
10140	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	±9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	±9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	±9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±9.6 %
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6 %
10151	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	±9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	±9.6 %
10158	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	±9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	±9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	±9.6 %
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	±9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	±9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±9.6 %
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±9.6 %
10175	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10177	CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10181	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±9.6 %
10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10193	CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	±9.6 %
10194	CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	±9.6 %
10195	CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	±9.6 %
10196	CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	±9.6 %
10197	CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	±9.6 %
10198	CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	±9.6 %
10219	CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	±9.6 %



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10220	CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6 %
10223	CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10241	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6 %
10243	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10244	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10247	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6 %
10248	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10250	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10251	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %
10260	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10261	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10266	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10269	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %



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10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	±9.6 %
10301	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	±9.6 %
10302	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	WiMAX	12.57	±9.6 %
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	±9.6 %
10304	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	11.86	±9.6 %
10305	AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	WiMAX	15.24	±9.6 %
10306	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	WiMAX	14.67	±9.6 %
10307	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	WiMAX	14.49	±9.6 %
10308	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	±9.6 %
10309	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	WiMAX	14.58	±9.6 %
10310	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	WiMAX	14.57	±9.6 %
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	±9.6 %
10313	AAA	iDEN 1:3	iDEN	10.51	±9.6 %
10314	AAA	iDEN 1:6	iDEN	13.48	±9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.71	±9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	±9.6 %
10317	AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	±9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	±9.6 %
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	±9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	±9.6 %
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	±9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	±9.6 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	±9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	±9.6 %
10396	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	±9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	±9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	±9.6 %
10401	AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	±9.6 %
10402	AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	±9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	±9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±9.6 %
10406	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	±9.6 %
10410	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	LTE-TDD	7.82	±9.6 %
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	±9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	±9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	±9.6 %
10417	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	±9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	WLAN	8.14	±9.6 %
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	WLAN	8.19	±9.6 %
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	±9.6 %
10423	AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	±9.6 %
10424	AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	±9.6 %
10425	AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	±9.6 %
10426	AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	±9.6 %
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	±9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6 %
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6 %
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	±9.6 %
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6 %
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	±9.6 %
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6 %
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±9.6 %

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